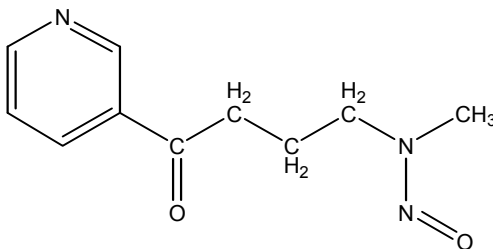


4-(N-NITROSOMETHYLAMINO)-1-(3-PYRIDYL)-1-BUTANONE

CAS No. 64091-91-4

First Listed in the *Sixth Annual Report on Carcinogens*



CARCINOGENICITY

4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK) is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC V.37, 1985; IARC S.7, 1987). When administered by multiple subcutaneous injections, the compound induced neuroblastomas and rhabdomyosarcomas of the nasal cavity, an adenocarcinoma and adenosquamous cell carcinomas of the lung, and hepatocellular carcinomas and hemangiosarcomas of the liver in rats of both sexes. In a similar study, NNK induced esthesioneuroepitheliomas, squamous cell carcinomas, anaplastic carcinomas, and spindle cell sarcomas of the nasal cavity; squamous cell carcinomas and adenocarcinomas of the lung; and benign and malignant tumors of the liver in rats of both sexes. An IARC Working Group interpreted the results as showing dose-response relationships for induction of tumors of the nasal cavity, lung, and liver. In two studies in which NNK was administered by multiple subcutaneous injections and one study in which NNK was administered as a single subcutaneous injection, adenocarcinomas of the lung, pleomorphic carcinomas of the nasal cavity, and tumors of the trachea were induced in hamsters of both sexes. When administered by intraperitoneal injection, NNK induced adenomas and carcinomas of the lung in female mice.

There are no adequate data available to evaluate the carcinogenicity of 4-(N-nitrosomethylamino)-1-(3-pyridyl)-1-butanone in humans (IARC V.37, 1985; IARC S.7, 1987).

PROPERTIES

NNK is a light yellow crystalline solid with a melting point of 63°-65 C. The abbreviation NNK was selected to emphasize the relationship of this compound to nicotine and stands for nicotine-derived nitrosamino ketone (IARC V.37, 1985). It is sensitive to prolonged exposure to air and light. Solutions of NNK in water are stable for at least 24 hours.

USE

NNK has no known use other than as a laboratory chemical.

PRODUCTION

NNK is not produced commercially (IARC V.37, 1985). It is an oxidation and nitrosation reaction product of nicotine.

EXPOSURE

NNK is formed during the curing, aging, and processing and smoking of tobacco (IARC V.37, 1985). It has been detected in tobacco at 0.1-35 mg/kg, in snuff products at 0.2-8.3 mg/kg, and in cigarette smoke at 0.1-0.5 µg/cigarette. It may also form in the mouth during tobacco chewing or oral snuff use. NNK has also been detected in the sidestream smoke of cigarettes. Potential exposure to NNK is widespread among tobacco product users and those exposed to sidestream smoke.

REGULATIONS

OSHA regulates NNK under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-105.